(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 340 600 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.09.2003 Bulletin 2003/36

(51) Int Cl.[7]: **B26B 21/40**

(21) Application number: **03011839.2**

(22) Date of filing: **20.04.1999**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB IT LI LU NL PT SE

(30) Priority: **24.04.1998 US 66499**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
01128638.2 / 1 188 526
99918692.7 / 1 073 545

(71) Applicant: **The Gillette Company**
Boston, MA 02199 (US)

(72) Inventors:
- **Swanson, Greald Ted**
  Thronton, CO 80233 (US)
- **Guay, Matthew Joseph**
  North Attleboro, MA 02760 (US)
- **Flaherty, Paul**
  Pembroke, MA 02359 (US)
- **Metcalf, Stephen C.**
  Newton, MA 02159 (US)

(74) Representative:
Ebner von Eschenbach, Jennifer et al
Ladas & Parry,
Dachauerstrasse 37
80335 München (DE)

Remarks:
This application was filed on 26 - 05 - 2003 as a divisional application to the application mentioned under INID code 62.

(54) Shaving device

(57) A manual shaving device for shaving soft, pliable, contoured underarm skin areas, comprising a hand-grippable portion, a head structure attached or attachable to the hand-grippable portion for support thereby, the head structure having an elongated razor blade structure including elongated front and rear portions and at least one elongated razor blade having an elongated exposed razor-sharp edge suitable for shaving hair disposed between and spaced from the front and rear portions, the exposed razor-sharp edge having first and second exposed ends and an effective exposed blade edge length, and the front and rear portions defining at least in part a working plane in which the exposed razor-sharp blade edge projects, and first and second non-shaving skin-engaging surfaces respectively located adjacent to and outwardly of the first and second exposed ends of the razor-sharp edge, the first and second skin-engaging surfaces being arranged to be operable to transmit force applied to the head structure into the soft pliable skin area under the non-shaving surfaces, and wherein the first and second non-shaving skin-engaging surfaces each have a curved configuration such that each surface has a generally curved profile when viewed from a distance in front of the elongated front portion of the head structure, and such that each skin-engaging surface provides generally non-binding snag-free contact and travel over soft pliable contoured skin areas being shaved.

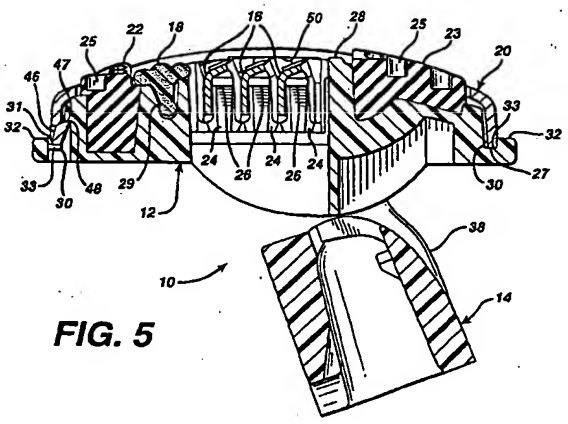


FIG. 5

EP 1 340 600 A2

Description

[0001] The present invention relates to a safety razor system and more particularly to a shaving system wherein a replaceable cartridge is provided for connecting a housing containing a plurality of razor blades onto a razor handle by employment of a pivotal connection.

[0002] Shaving systems are known wherein a replaceable cartridge contains a housing having a plurality of blades contained therein, the blades being resiliently mounted relative to the housing so as to deflect in response to the contours of the skin during the shaving process. It is also known to pivotably mount the blade-carrying housing to a razor handle by employing a connector member to produce a replaceable cartridge wherein the connector member contains structure for receiving a disconnectable handle in interconnecting engagement. The design and implementation of a structure employing the above features is shown and described in copending PCT Patent Application WO97/37819 and in copending U.S. Serial No. 08/802,381, each of which is assigned to the assignee of the present invention and herein incorporated by reference.

[0003] Razor systems have also been proposed, particularly for use by women, wherein the generally accepted rectangular shape of the razor-carrying housing has been abandoned and replaced by a substantially oval-shaped configuration which is more easily adapted to use in shaving the legs or underarm of the user. In addition, it has been proposed that the plurality of parallel blades disposed in the elongated housing member be provided with skin-contacting surfaces at either side thereof which are manufactured of a resilient material having upwardly projecting cup surfaces which serve to stretch the skin during the shaving process and capture a lubricous shaving preparation applied to the skin. The above features are shown and described in PCT Patent Application WO97/17174 assigned to the assignee of the present invention and herein incorporated by reference.

[0004] The above-enumerated features all are effective to produce a shaving system which is greatly improved over those of the prior art, when employed under normal conditions. However, it has been found that, in many instances, the razor system may be subjected to abnormal abuse, such as repetitive dropping on tile flooring in the shower, or, in some instances, during carrying of the razor system during travel. Under these conditions, the cutting edge of the razor blades may become slightly misaligned, one with the other, or with the guard bar provided forward of the blade edges, or when employing a pivotal interconnect member as referenced above, the interconnect member and the housing containing the blades may become misaligned. Each of these conditions could affect the ease and comfort of the shaving process that the user would expect from the safety razor system.

[0005] It is, therefore, an object of the present invention to provide a shaving system comprising a blade-carrying housing having a guard member parallel with an adjacent blade edge, wherein the designed location of the blade edge relative to a surface of the guard member is maintained during a useful lifetime of the shaving system.

[0006] A further object of the invention is to provide a shaving system of the type described wherein retention and location of the various elements of the system is ensured during usage of the system.

[0007] Yet another object of the invention is to provide a shaving system having a plurality of parallel blades which are spring-biased which provides improved control over the limitation of blade movement in the biased direction during employment of the system.

[0008] Still another object of the invention is to provide a shaving system having a unitary member which is effective to retain a plurality of blades in the system and maintain the blade edges in alignment, one with the other, and with a guard surface disposed parallel to the blades.

[0009] Yet another object of the invention is to provide a safety razor system having a blade-carrying housing member and an interconnect member for pivotably attaching the housing to a razor handle whereln the interconnect member is simple in construction and provides ease of attachment to the blade-carrying housing.

[0010] The above objects, and other objects which will become apparent as the description proceeds, are accomplished by providing a safety razor system having an elongated housing with at least one blade extending lengthwise and upwardly from an upper surface of the housing. A unitary retainer member is disposed about the periphery of the housing on an upper surface thereof and contacts opposite ends of the blade or blades. The retainer and housing further have interfitting latch structure supporting the unitary retainer member against upward movement relative to the housing, whereby movement of the blade or blades in the upward direction is restricted by contact with the unitary retalner member.

[0011] The housing is substantially of rectangular shape in plan form and has arcuate end portions. The blade means may comprise a plurality of blades, for example, three in number, and the blades may be resiliently biased toward the retainer member.

[0012] A guard bar is generally affixed, preferably rigidly affixed, to the upper surface of the housing and extends lengthwise of the housing projecting upwardly in spaced relation with, and parallel to, the plurality of blades. The plurality of blades are generally manufactured of a stainless steel, and the retainer member may be of an aluminum material to inhibit corrosion of the blades.

[0013] As a further feature of the invention, the safety razor system is provided with wall structure forming a pair of cavities, one disposed adjacent a lower surface of each end of said housing, and an interconnect mem-

ber for pivotably connecting the housing onto a razor handle attached to the housing. The interconnect member can be formed integral with the razor handle, as when the shaving unit is supplied as part of a disposable razor, or preferably detachable therefrom so that a fresh housing and interconnect member can be exchanged as with a replaceable razor system. The interconnect member generally comprises a unitary body having a pair of opposed arms at either side thereof extending outwardly lengthwise of the housing and received in a respective cavity on the housing. A pair of first and second opposed coaxial bearing surfaces are disposed at each side of the interconnect member for contacting the housing. Each of a first pair of bearing surfaces is disposed on a respective arm and received in a respective cavity, and each of the second bearing surfaces is disposed on the unitary body inwardly of the first bearing surface, each of the first bearing surfaces being located for contacting a portion of a cavity wall structure and each of the second bearing surfaces being located for contact with an under surface of the housing.

[0014] Each of the second bearing surfaces is generally of a greater area than a first bearing surface, and each of the first bearing surfaces may lie entirely within a respective cavity while each of the second bearing surfaces lie entirely outside of a housing cavity.

[0015] Reference is made to the accompanying drawing in which there is shown an illustrative embodiment of the invention from which its novel features and advantages will be apparent, wherein:

Figure 1 is a perspective exploded view showing a safety razor system constructed in accordance with the teachings of the present invention;

Figure 2 is top plan view showing the safely razor system in assembled form;

Figure 3 is a bottom plan view showing the assembled structure of Figures 1 and 2 having movable elements thereof positioned differently than as shown in Figure 2;

Figure 4 is a top plan view showing a pair of the elements of Figure 1 connected to one another as found in the assembled structure;

Figure 5 is an elevational sectional view taken along the line V-V of Figure 2 showing details of the assembled structure of Figures 1 through 3;

Figure 6 is a sectional view taken along the line VI-VI of Figure 12, shown on an enlarged scale for clarity;

Figure 7 is a bottom plan view showing details of an element of the structure of Figures 1 through 3;

Figure 8 is an elevational sectional view taken along the line VIII-VIII of Figure 4 showing further details of the assembled structure of Figures 1 through 3;

Figure 9 is a fragmentary sectional view taken along the line IX-IX of Figure 8 showing, on an enlarged scale, a portion of the assembled structure of Figures 1 through 3 in detail;

Figure 10 is a fragmentary sectional view taken along the line X-X of Figure 8 showing, on an enlarged scale, another portion of the assembled structure of Figures 1 through 3; and

Figure 11 is an elevational side view of the assembled structure of Figures 1 through 3 showing relative movement of the elements of the assembly during usage in the shaving process; and

Figure 12 is a bottom plan view showing details of the unitary annular retainer clip employed in the structure of Figures 1 through 3.

[0016] Referring to the drawing and in particular to Figures 1 through 4, there is shown a safety razor system 10 comprising an elongated housing 12 and an interconnect member 14. The housing is provided with a plurality of blades 16, three in number, and a shaving aid strip 18 mounted onto the elongated housing behind the blades in a cap position and in parallel relationship with the blades. A unitary annular retainer clip 20 is provided for assembly about the periphery of the housing 12 contacting the ends of the blades 16, in the assembled position.

[0017] Referring still to Figures 1 through 4 and in particular Figure 1, the housing 12 is formed of a relatively rigid non-elastomeric thermoplastic material such as sold under the trade name Noryl PX-5511, available from GE Plastics, which suitably bonds with a pair of skin-tensioning portions 22 (which can also be referred to as a cap surface) and 23 of elastomeric material, which may be co-molded (also referred to as two material injection molding) with the basic portion of the housing 12, and which can be molded from an elastomeric plastic, such as sold under the trade name Kraiburg PC 5GIL, available from the Kraiburg Company (Germany), which suitably bonds with the housing 12. The skin-tensioning portions can also be molded from elastomeric materials as is described in detail in U.S. Patent No. 5,249,361 which is incorporated herein by reference. The skin-tensioning portions 22 and 23 are effective in exerting traction forces on the skin and in simultaneously tensioning the skin on both sides of the blades during the shaving process. The skin-tensioning portions have a plurality of cup-shaped openings 25 formed therein, which are also effective in holding and distributing water and shave gel over large surfaces during wet shaving.

[0018] The housing 12 is of substantially rectangular shape in plan form having arcuate end portions, and slots 24 are provided inwardly of each of the end portions for receiving ends of the blades 16 in the assembly of the razor system 10. The blades 16 are manufactured of a stainless-steel material as is well-known in the art, and when received in the slots 24 are biased upwardly by a plurality of spring-biasing elements 26 formed on the housing 12.

[0019] A guard member 28 extends parallel to and adjacent the three blades 16 and the skin-tensioning portion 23, the guard member preferably, but not necessar-

ily, being molded as a portion of the housing 12, or in the alternative co-molded with the housing 12 out of a plastic having different characteristics than those of the housing, or may be a separate element rigidly affixed to the housing. Guard member 28 may also include a guard member movable relative to housing 12 as in U. S. Patent 5,063,667 (Jacobson), or the guard member 28 may also include a resilient guard member portion of the type shown in U.S. Patent Number 5,191,712 (Crook), or 5,661,907 (Apprille), which are hereby incorporated by reference.

[0020] The shaving aid strip 18 is located in the cap region and is a strip-shaped member generally of the type comprising a mixture of a hydrophobic material and a water-leachable hydrophilic polymer material as is described in U.S. Patent Numbers 5,113,585 and 5,454,164, which are hereby incorporated by reference. The shaving strip aid 18 is received in a slot 29 in the housing 12 and is positioned parallel with the blades 16 and the guard member 28. The shaving aid strip 18 may be held in place through an interference fit with the slot 29, or may be fastened by adhesive or mechanical means.

[0021] The retainer clip 20, which is shown in detail at Figure 12, is generally manufactured of an aluminum material having a coating, and is of similar shape in plan form as the elongated housing 12, being of rectangular form having arcuate end portions. It is preferred that the coating be on the outer surface and that the clip 20 be uncoated on its underside to provide galvanic protection for the blades. It is preferred that the coating is a polymer coating formed from materials such as polyester, epoxy or two-layer vinyl and polyester systems. The coating can also be an anodized coating. Because the retainer clip 20 surrounds the housing on upper and side surfaces contacting the skin, it is desirable that the coating provide low friction characteristics. As shown in Figure 12, the retainer clip 20 has four datum surfaces 27 formed such as by coining on the underside thereof at the rim 30, and the elongated housing has four mating datum surfaces 33 which are provided in a groove 31 formed on the lip 32 at the periphery of the housing 12. In the assembled condition the lower edge 30 is received in the groove 31 and the datum surfaces 27 and 33 matingly contact along a predetermined plane. A pair of tabs 34, which provide a latch system for maintaining each of the datum surfaces 27 in contact with a respective datum surface 33 as will be explained below, extend downwardly through a pair of openings 36 and are bent inwardly, one toward the other, against the underside of the housing 12, to assemble the retainer ring onto the housing 12. If the cartridge is abusively dropped and impacts its top surface, the retainer clip 20 would be urged simply into its seat between the datum surfaces 27 and 33 in groove 31, and the load dispersed into the housing 12. Thus, the load is not transmitted to the tabs 34, allowing the tabs 34 to be relatively small.

[0022] As will be noted in Figures 5 and 6, the housing upper surface at the skin-tensioning portions 22 and 23 and retainer clip 20 are arcuate in the transverse direction. This provides good skin-contour following, especially in an underarm region, and imparts stiffness to the retainer clip 20 to better hold on to the housing 12.

[0023] As will be noted from Figures 5, 6 and 12, the retainer clip 20 further has a linear coined portion forming a recess which serves as a datum surface 50 for contacting the upper ends of the blades 16, limiting upward movement of the blades relative to the blade guard 28. The datum surfaces 27 and 33 provide the mating surfaces between the retainer clip 20 and the housing 12 at the rim 30, and establish a plane which is parallel to, and at an established distance from, the recess 50, thereby controlling the extent of upward movement of the blades relative to the housing 12 and the blade guard 28.

[0024] The interconnect member 14 generally comprises a unitary body 38 having a pair of opposed arms 39 and 40 extending outwardly from the body 38 which are employed to connect the housing 12 onto a razor handle (not shown). The interconnect member 14 is generally manufactured of a semi-rigid plastic material, such as a material sold under the trade name Noryl PX-1265, available from GE Plastics, for suitable strength, and has a pair of slotted V-shaped openings 42 and 44 formed in the upper portion of the body 38. The slotted openings are formed of a configuration to allow movement of the arms 39 and 40 towards one another to the extent that they may be received in the housing 12 during the assembly of the interconnect member onto the housing during manufacture, and thereafter form a permanent connection not intended to be removed.

[0025] The lower handle receiving portion of the interconnect member 14 may take various forms depending upon the use of the safety razor system 10. That is, when the razor system is employed as a replaceable cartridge, the structure of the body will be provided with structure as shown, formed to receive a razor handle, such as that described in PCT Patent Application W097/37819 or in copending U.S. Serial No. 08/802,381, each of which is herein incorporated by reference and referred to above. However, the razor system 10 may be employed with a handle of a different type, such as the rigid attachment of the body 38 onto, or in unitary formation with, a handle when the system is employed in a discardable razor. In any employment of the safety razor system 10, however, it should be understood that the housing 12 is supported on the interconnect member 14 such that pivotable movement is provided between the housing and the interconnect member during the shaving operation. A spring mounted on the handle and extending through the interconnect member 14 provides a return bias force assisting pivotal movement, as described in W097/37819.

[0026] In the design of the present safety razor system 10 it is necessary that the plurality of blades 16 maintain their cutting edges in proper orientation, one

relative to the other, during the shaving process, and that the blades be limited in their upward movement such that they do not extend upwardly beyond the designed limit, relative to the guard member 28. Maintaining proper position of the blades 16 relative to the guard 28 is essential to ensure integrity of the structure and proper operation of the razor system during its useful lifetime.

[0027] As referred to above, in order to maintain the datum surfaces 50 at the proper predetermined position, a latch system is provided to ensure maintaining contact between each of the datum surfaces 27 and its respective datum surface 33.

[0028] As shown in Figures 5 and 6, and Figure 12, taken in conjunction with Figures 1 through 4, in addition to the engagement of the tabs 34 with the housing 12, the latch system provides that the retainer clip 20 can be provided with four coined inwardly extending latch portions 46 having upwardly facing surfaces 47 (two of which are shown in Figures 6 and 12) which are spaced symmetrically about the edge 30 of the retainer clip. Four mating downwardly facing detent surfaces 48, shown in Figures 1, 4, and 5, are formed in the inner wall of the groove 31 of the housing 12. The retainer clip 20 is constructed such that inwardly extending latch portions 46 of the edge 30 extend inwardly of the inner wall of the groove 31, which results in the surfaces 47 and 48 being snapped into contact when the retainer clip 20 is received onto the housing 12. Since latching surface 47, 48 can contribute to restraining the clip 20 from separating from housing 12, the tabs 34 that are bent into slots 36 can, therefore, be made relatively small.

[0029] While the present latch system, as shown, employs latch elements including both the pair of tabs 34 mating with the bottom surface of the housing 12 and the latching surfaces 47 and 48, it should be understood that a more simple latch system may be employed, as is presently preferred, by utilizing only the two tabs 34 which are assembled as described above, when it is deemed that only that portion of the system is needed. That is, the latch portions 46 may be eliminated from the retainer clip 20 and the latching surfaces 47 and 48 deleted from the housing 12 when only the tabs 34 are needed to maintain the datum surfaces 27 and 33 in continuous contact.

[0030] Referring now to Figures 3 and 7 through 11, the bottom surface of the housing 12, as shown in Figure 3, has a pair of bosses 52 and 53 formed thereon, and a pair of recesses 55 and 56 are formed in the wall structure of the housing for receiving the arms 39 and 40. As best shown in Figure 8, the slots 42 and 44 combined with the choice of a flexible plastic material as set forth above, allow for simple assembly, one time only during manufacturing, of the interconnect member 14 onto the housing 12 through insertion of the arms 39 and 40 into the respective cavities 55 and 56 when the arms are compressed inwardly towards one another, and allowed to assume the position shown in Figure 8 upon release. This allows assembly and retention of pivotably interconnected members retained securely as an assembly unit, and thereafter the blades can be inserted and retained by the retainer clip 20.

[0031] However, this simple form of assembly requires that the arms 39 and 40 be relatively small and, therefore, prohibits the provision of large bearing surfaces within the cavity 55 or 56, as best shown in Figures 9 and 10 taken in conjunction with Figure 8. As upward forces tending to pull the housing 12 away from the interconnect member 14 are generally small, either during the shaving process or in the event of dropping the razor system 10 onto a hard surface, the present structure provides a pair of coaxial first bearing surfaces 58 and 59, at either side of the interconnect member 14, lying wholly within cavity 55 or 56 which absorb only upward forces, and second bearing surfaces 60 and 61 lying outside of the cavity which absorb the greater downward or compressive forces. That is, the greater force produced during the shaving process, or due to dropping of the razor system 10, is absorbed by the larger bearing surfaces 60 and 61 which are not so limited as to surface area as the bearing surfaces 58 and 59 which of necessity are smaller due to their location within the cavities 55 and 56. On the interconnect member 14, the first bearing surfaces 58 are downwardly facing and the second bearing surfaces 61 are upwardly facing.

[0032] As shown in Figure 11, with the structural location of the bearings 58, 59, 60 and 61, as described above, the elongated housing 12 is free to rotate about a virtual axis which is located substantially in the vicinity of the guard member 28. It is presently preferred that this virtual pivot axis is in front of the cutting edge of the primary blade and in proximity to or below a plane tangent to the leading and trailing blade cutting edges, as observed in an unloaded state free of cutting forces.

[0033] From the above it should be evident that the razor system 10 includes structure which is simple to manufacture and assemble, and which will withstand the rigors of inadvertent dropping or other mishaps which might tend to misalign the blades 16 or cause the interconnect member to become dislodged from the housing 12. By providing a latch system as set forth above, the retainer ring 20 is fixed within the lip 32 in a manner to retain the blades 16 in the proper position relative to the guard member 28, due to contact between the datum surfaces 27, 33 and 50. The employment of a unitary member having arcuate ends as in the construction of the retainer ring 18 serves to provide rigidity to the structure. Further, the providing of a retainer clip 20, manufactured of aluminum material, provides a sacrificial metal source when combined with the stainless steel blades, thus inhibiting corrosion of the steel blades. The upper exposed surface of the clip 20 can be coated to provide desirable surface features for aesthetics, or can be coated with a low friction coating.

[0034] The use of the retainer clip 20 allows a more ruggedized, permanent connection of the blade housing

12 to the interconnect member, whereby the assembly is connected together once and then it resists disconnecting, such as in dropping. The retainer clip 20 is dedicated to permanently securing the parts to the blade housing, and the arms on the interconnect are strengthened to include two pairs of inboard and outboard bearing surfaces dedicated to resisting separation by impact loads.

[0035] Further, the assembly of the interconnect member 14 to the housing 12 is of simple construction, and the location of the coaxial bearing surfaces produces a pair of connected members which are capable of maintaining integrity of the structure during extreme usage. The retainer clip 20 does not secure the pivotably interconnected member 14 to blade housing 12, so the bearing area can be made larger to absorb the load of abusive dropping of a relatively large cartridge.

Claims

1. A manual shaving device for shaving soft, pliable, contoured underarm skin areas, comprising a hand-grippable portion, a head structure attached or attachable to the hand-grippable portion for support thereby, the head structure having an elongated razor blade structure including elongated front and rear portions and at least one elongated razor blade having an elongated exposed razor-sharp edge suitable for shaving hair disposed between and spaced from the front and rear portions, the exposed razor-sharp edge having first and second exposed ends and an effective exposed blade edge length, and the front and rear portions defining at least in part a working plane in which the exposed razor-sharp blade edge projects, end first and second non-shaving skin-engaging surfaces respectively located adjacent to and outwardly of the first and second exposed ends of the razor-sharp edge, the first and second skin-engaging surfaces being arranged to be operable to transmit force applied to the head structure into the soft pliable skin area under the non-shaving surfaces, and wherein the first and second non-shaving skin-engaging surfaces each have a curved configuration such that each surface has a generally curved profile when viewed from a distance in front of the elongated front portion of the head structure, and such that each skin-engaging surface provides generally non-binding snag-free contact and travel over soft pliable contoured skin areas being shaved.

2. A manual shaving device for shaving soft, pliable, contoured underarm skin areas, comprising a hand-grippable portion, a head structure attached or attachable to the hand-grippable portion for support thereby, the head structure having an elongated razor blade structure including elongated front and rear portions and at least one elongated razor blade having an elongated exposed razor-sharp edge suitable for shaving hair disposed between and spaced from the front and rear portions, the exposed razor-sharp edge having first and second exposed ends and an effective exposed blade edge length, and the front and rear portions defining at least in part a working plane in which the exposed razor-sharp blade edge projects, and first and second non-shaving skin-engaging surfaces respectively located on opposite regions of the head structure with the elongated razor blade structure being located therebetween, the first and second skin-engaging surfaces being arranged to be operable to transmit force applied to the head structure into the soft pliable skin area under the non-shaving surfaces, and wherein the first and second non-shaving skin-engaging surfaces each have a curved configuration such that each surface has a generally curved profile, and such that each skin-engaging surface provides contact and travel over soft pliable contoured skin areas being shaved.

3. The manual shaving device of claims 1 or 2, wherein the head structure has an longitudinal axis, and the exposed blade edge is generally parallel to the longitudinal axis.

4. The manual shaving device of claim 3, wherein the head structure has a transverse center line generally perpendicular to the longitudinal axis, and the first and second non-shaving surfaces are arranged symmetrically about the transverse center line.

5. The manual shaving device of claim 1, wherein at least a portion of the head structure is arranged to be flexible in response to forces applied between the hand-grippable portion and the head structure during shaving.

6. The manual shaving device of claim 5, wherein the head structure includes, as the portion of the head structure arranged to be flexible, an elongated base provided with a central portion and first and second opposed extension portions located on opposite sides of the central portion, and the first and second non-shaving surfaces are respectively disposed upon and form part of the first and second extension portions.

7. The manual shaving device of claim 1, wherein the head structure includes a base portion provided with first and second opposed extension portions, and the first and second non-shaving surfaces are respectively disposed upon and form part of the first and second extension portions,

8. The manual shaving device of claim 1, wherein at

least a portion of each of the first and second non-shaving surfaces is elevated substantially above the working plane established by the elongated front and rear portions, thereby generally helping to ensure that the skin is engaged and the skin is being deformed prior to the razor-sharp edge contacting the skin to be shaved.

9. The manual shaving device of claim 8, wherein the first and second non-shaving surfaces are each arranged as a gliding surface, and are each configured to be arranged in substantial part above the working plane, and each have a curved profile from front to rear of the head structure and from side to side of the head structure.

10. The manual shaving device according to claim 1, wherein the head structure includes an elongated base portion with first and second extension portions generally disposed adjacent to the first and second non-shaving surfaces.

11. The manual shaving device of claim 1, wherein the at least one razor blade is formed from a single flat straight strip of razor blade material having a razor-sharp edge along only one edge thereof, and the one razor blade, when installed in the head structure, has a flat configuration and its exposed razor-sharp edge lies along a straight line.

12. The manual shaving device of claim 1, wherein the elongated razor blade structure includes a plurality of elongated razor blades each spaced from and substantially parallel to one another, each razor blade has an elongated exposed razor-sharp edge, suitable for shaving hair, disposed between and spaced from the elongated front and rear portions, said razor-sharp edge projecting into the working plane defined by the elongated portions, and the exposed razor-sharp edges are of substantially the same effective exposed blade edge length, and each of the razor-sharp edges has first and second exposed ends.

13. The manual shaving device of claim 2, wherein the first and second non-shaving skin-engaging surfaces each include grip-enhancing surface formations.

14. In a manual razor blade shaving device of the type suitable for shaving underarm skin areas, a razor head structure suitable for attachment to a handle portion, the razor head structure for underarm shaving comprising a base portion supportable by the handle portion of the shaving device, an elongated razor blade structure attached to the base portion, including elongated front and rear portions and at least one elongated razor blade having an elongated exposed razor-sharp edge having a blade edge profile suitable for shaving hair disposed between the elongated front and rear portions, the razor blade having first and second ends, and an effective exposed blade edge length and the elongated portions defining at least in part a working plane, and first and second non-shaving glide surfaces respectively located outwardly adjacent to the first and second ends of the razor blade, the first and second glide surfaces being arranged to be operable to transmit force applied to the head structure into the skin area under the glide surfaces so as to adjust the contour of the skin area beneath the head structure more closely to match the profile of the blade structure, whereby the razor blade edge may more safely engage the skin area to be shaved.

15. In a manual razor blade shaving device of the type suitable for shaving underarm skin areas, a razor head structure suitable for attachment to a handle portion, the razor head structure for underarm shaving comprising a base portion supportable by the handle portion of the shaving device, an elongated razor blade structure attached to the base portion, including elongated front and rear portions and at least one elongated razor blade having an elongated exposed razor-sharp edge having a blade edge profile suitable for shaving hair disposed between the elongated front and rear portions, the razor blade having first and second ends, and an effective exposed blade edge length and the elongated portions defining at least in part a working plane, and first and second non-shaving surfaces respectively located on opposite regions of the razor head structure with the razor blade structure being located therebetween, the first and second non-shaving surfaces being arranged to be operable to transmit force applied to the head structure into the skin area under the surfaces so as to adjust the contour of the skin area beneath the head structure more closely to match the profile of the blade structure, whereby the razor blade edge may more safely engage the skin area to be shaved.

16. A manual shaving device for shaving soft pliable skin areas, comprising a handle to be gripped by a user of the device to move and manipulate the device over an area of skin to be shaved, and an elongated razor head structure connected or connectable to the handle, the head structure having a longitudinal axis; an elongated surface to contact the skin in the vicinity of the area of skin to be shaved, an elongated razor head base portion arranged along the longitudinal axis, at least one elongated razor blade, supported by the razor head base portion, with an elongated exposed razor-sharp edge extending generally parallel to the longitudinal axis, and first and second non-shaving, skin-engaging, force-applying glide surfaces forming part of the

surface of the head structure, the glide surfaces being located on opposite ends of and outwardly of the exposed razor-sharp edge near opposite ends of the base portion, and, being arranged for applying mechanical force from the handle through the razor head base portion to an area of skin adjacent to both sides of the skin to be shaved, each having a generally curved profile when viewed from a distance in front of the elongated razor head structure, including having rounded outer edge portions, whereby the non-shaving force-applying glide surfaces are sized and shaped to facilitate the shaving of soft skin areas, help minimize nicks and cuts during shaving thereof and provide means for applying a non-shaving force against the skin to cause the skin more closely to match the blade edge profile of the exposed razor-sharp edge.

17. A manual shaving device for shaving soft pliable skin areas, comprising a handle to be gripped by a user of the device to move and manipulate the device over an area of skin to be shaved, and an elongated razor head structure connected or connectable to the handle, the head structure having a longitudinal axis, an elongated surface to contact the skin in the vicinity of the area of skin to be shaved, an elongated razor head base portion arranged along the longitudinal axis, at least one elongated razor blade, supported by the razor head base portion, with an elongated exposed razor-sharp edge extending generally parallel to the longitudinal axis, and first and second non-shaving, skin-engaging, force-applying surfaces forming part of the head structure, the non-shaving surfaces being located on opposite regions of the razor head structure with the razor blade being located therebetween, and, being arranged for applying mechanical force from the handle through the razor head base portion to an area of skin adjacent to the area of skin to be shaved, each non-shaving surface having a generally curved profile when viewed from a distance, whereby the non-shaving force-applying surfaces are sized and shaped to facilitate the shaving of soft skin areas, help minimize nicks and cuts during shaving thereof and provide means for applying a non-shaving force against the skin to cause the skin more closely to match the blade edge profile of the exposed razor-sharp edge.

18. A manual shaving device as in claims 16 or 17, wherein the razor head structure has a plurality of elongated exposed razor blades each spaced from one another, each provided with a razor-sharp edge which runs generally in a direction parallel to the longitudinal axis.

19. A manual shaving device as in claim 16, wherein the first and second non-shaving glide surfaces are each arranged generally symmetrical about the longitudinal axis of the razor head structure, and are each curved and smooth, and each have at least front edge portions and outer edge portions which are rounded, whereby the non-shaving surfaces are configured to run smoothly over the skin adjacent to the skin to be shaved by the razor-sharp edge and to minimize snagging and scratching such skin.

20. A manual shaving device as in claim 16, wherein the skin-engaging surfaces of the non-shaving glide surfaces are arranged in close proximity to the exposed razor blade edge, and are laterally adjacent to the exposed razor sharp edge, and extend in part forwardly of and in part rearwardly of an imaginary line extending outwardly from and generally tangent to the razor-sharp blade edge.

21. A manual shaving device as in claim 20, wherein the skin-engaging glide surfaces have a forward rounded edge and rearward rounded edge.

22. A manual shaving device as in claim 16, wherein the elongated razor blade structure has a central transverse axis, and the skin-engaging non-shaving surfaces are symmetrically arranged about the central transverse axis, forming a matched mirror-image pair, with the skin engaging surfaces having substantially equal surface areas.

23. A manual shaving device as in claim 16, further comprising front and rear non-shaving surface structures spaced from and respectively located forwardly and rearwardly of the exposed razor-sharp blade edge with the first and second non-shaving glide surfaces being sufficiently wide about the longitudinal axis to blend into the front and rear non-shaving surface structures.

24. A manual shaving device as in claim 23, where the front non-shaving surface structure includes a front structure and the rear non-shaving surface structure includes a rear structure, the front and rear structures cooperating to define a working plane in which the exposed razor-sharp edge of the razor blade projects.

25. A manual shaving device as in claim 24, wherein an elongated shaving aid is located at or proximate the rear structure.

26. A manual shaving device as in claim 17, wherein the first and second non-shaving force-applying surfaces retain liquid.

27. A manual shaving device, comprising a handle grippable by a user, and a razor head structure, connected or connectable to the handle, including an

elongated face having a longitudinal axis and arranged for contacting skin to be shaved, at least one elongated razor blade with an elongated exposed razor-sharp edge having a generally predetermined profile, and at least a first non-shaving, skin-engaging, force-applying glide surface forming part of the face and arranged to extend outwardly of a first end of the razor-sharp edge, the glide surface being arranged for applying mechanical force emanating from the handle to the skin adjacent to the skin to be shaved so as to alter the skin to be shaved more closely to match the predetermined profile of the exposed razor-sharp edge of the razor blade.

28. A manual shaving device, comprising a handle grippable by a user, and a razor bead structure, connected or connectable to the handle, including an elongated face having a longitudinal axis and arranged for contacting skin to be shaved, at least one elongated razor blade with an elongated exposed razor-sharp edge having a generally predetermined profile, and at least a first non-shaving, skin-engaging, force-applying surface forming part of the face and located proximate to the razor edge, the non-shaving surface being arranged for applying mechanical force emanating from the handle to the skin adjacent to the skin to be shaved so as to alter the skin to be shaved more closely to match the predetermined profile of the exposed razor-sharp edge of the razor blade.

29. A manual shaving device as in claim 27, wherein the exposed razor-sharp edge has a second end, spaced from the first end, and the razor head structure includes a second non-shaving, skin-engaging, force-applying glide surface forming part of the face and arranged to extend outwardly of the second end of the razor-sharp edge opposite the first end of the razor-sharp edge.

30. A manual shaving device as in claim 28, wherein the exposed razor-sharp edge has a second end, spaced from the first end, and the razor head structure includes a second non-shaving, skin-engaging, force-applying surface forming part of the face and located proximate to the razor edge opposite of the first non-shaving surface with the elongated razor blade being located therebetween.

31. A manual shaving device as in claim 29, wherein the razor head structure further includes front and rear elongated structures spaced from the exposed razor-sharp edge of the razor blade, the front and rear elongated structures defining at least in part a working plane into which the exposed razor-sharp edge extends, the front and rear elongated structures including top surfaces which form part of the face of the razor head structure; and the first and second non-shaving glide surfaces are arranged to form lateral extensions extending outwardly from the front and rear elongated structures.

32. A manual shaving device as in claim 29 wherein the skin-engaging glide surfaces are arranged in close proximity to and are laterally adjacent to opposite ends of the exposed razor-sharp edge, and extend in part forwardly of and in part rearwardly of an imaginary line generally tangent to the razor-sharp edge, and the skin-engaging glide surfaces each have a forward rounded edge section and an outer rounded edge section.

33. A manual shaving device as in claims 27 or 28, wherein the exposed razor-sharp edge of the razor blade is substantially straight.

34. A manual shaving device as in claims 27 or 28, wherein the razor blade structure has a plurality of elongated razor blades generally evenly spaced from one another, each razor blade provided with a razor-sharp edge which runs in a direction generally parallel to the razor-sharp edge of the other razor blade.

35. In a manual razor blade shaving device suitable for shaving soft pliable contoured skin areas, a razor head structure suitable for attachment to a handle portion, the razor head structure comprising an elongated base portion having a longitudinal axis, a razor blade cartridge structure attachable to the base portion, the blade cartridge structure including first and second opposite ends and at least a first razor blade strip having an exposed razorsharp edge with a blade edge profile suitable for shaving hair stubble from contoured skin areas, the razor-sharp edge being arranged generally parallel to the longitudinal axis, and at least a first non-shaving surface located adjacent to the first end of the razor blade cartridge structure outboard of the exposed razor-sharp edge and operable to transmit force applied to the head structure from the handle portion to the skin area in an amount sufficient for adjusting the contour of the soft pliable skin area to be shaved to match more closely the profile of the razor blade cartridge structure while controlling the application of force from the blade cartridge structure upon the skin area, and wherein the first non-shaving surface has a generally curved profile, including outer edge portions that are rounded, when the razor blade head structure is viewed at a distance.

36. The razor head structure as in claim 35, further comprising a second non-shaving surface located adjacent to the second end of the blade cartridge structure opposite the first non-shaving surface and outboard of the exposed razor-sharp edge and op-

erable to transmit force applied to the head structure from the handle portion to the skin area in an amount sufficient for adjusting the contour of the soft pliable skin area to be shaved to match more closely the profile of the blade cartridge structure while controlling the application of force from the blade cartridge structure upon the skin area, the first and second non-shaving surfaces each being arranged to work together to apply, to areas of soft pliable skin adjacent to the skin to be shaved by the razor-sharp edge, sufficient pressure to substantially flatten the skin to be shaved.

37. In a manual razor blade shaving device suitable for shaving soft pliable contoured skin areas, a razor head structure suitable for attachment to a handle portion, the razor head structure comprising an elongated base portion having a longitudinal axis, a razor blade cartridge structure attachable to the base portion, the blade cartridge structure including first and second opposite ends and at least a first razor blade strip having an exposed razorsharp edge with a blade edge profile suitable for shaving hair stubble from contoured skin surfaces, the razor-sharp edge being arranged generally parallel to the longitudinal axis, and at least a first non-shaving surface located at a first region the razor blade cartridge structure adjacent the exposed razor-sharp edge and operable to transmit force applied to the head structure from the handle portion to the skin area in an amount sufficient for adjusting the contour of the soft pliable skin area to be shaved to match more closely the profile of the razor blade cartridge structure while controlling the application of force from the blade cartridge structure upon the skin area, and wherein the first non-shaving surface has a generally curved profile, including outer edge portions that are rounded, when the razor blade head structure is viewed at a distance.

38. The razor head structure as in claim 37, further comprising a second non-shaving surface located at a second region of the blade cartridge structure opposite the first non-shaving surface with the exposed razor-sharp edge being located therebetween and operable to transmit force applied to the head structure from the handle portion to the skin area in an amount sufficient for adjusting the contour of the soft pliable skin area to be shaved to match more closely the profile of the blade cartridge structure while controlling the application of force from the blade cartridge structure upon the skin area, the first and second non-shaving surfaces each being arranged to work together to apply, to areas of soft pliable skin adjacent to the skin to be shaved by the razor-sharp edge, sufficient pressure to substantially flatten the skin to be shaved.

39. The razor head structure as in claim 36, wherein the skin-contacting areas of the first and second non-shaving surfaces are each provided with a surface that tends to grab and grip the skin during use.

40. The razor head structure as in claim 36, wherein the razor head structure has a skin-engaging face, and the non-shaving surfaces form part of the skin-engaging face, the razor head structure further includes front and rear elongated structures spaced from the exposed razor-sharp blade edge, the elongated structures define in part a working plane into which the razor-sharp edge of the first blade strip extends, the front and rear elongated structures include top surfaces which from part of the face of the razor head structure, and the first and second non-shaving surfaces are arranged to form extensions of the front and rear elongated structures.

41. The razor head structure as in claim 40, wherein the razor blade cartridge structure further includes at least a second razor blade strip having an exposed razor-sharp edge and a blade edge profile suitable for shaving hair stubble from contoured skin areas and arranged generally parallel to the longitudinal axis, the exposed razor-sharp blade edges of the first and second razor blade strips being substantially continuous and being spaced from one another and from the front and rear elongated structures.

42. The razor head structure as in claim 40, wherein the non-shaving surfaces are constructed as part of the razor blade cartridge structure and are arranged in close proximity to and are laterally adjacent to the end of the exposed razor edges, and extend in part forwardly of and in part rearwardly of the longitudinal axis of the base portion, when the face of the razor head structure is viewed at a distance, and the non-shaving surfaces each have a forward rounded edge section and an outer rounded edge section.

43. The razor head structure as in any of claims 35 to 42, further comprising means for removably attaching a handle portion to the base portion.

44. The razor head structure as in any of claims 35 to 43, wherein the razor blade cartridge structure is flexible and arranged to allow the first razor blade strip to move relative to the base portion, and the base portion and razor blade cartridge structure are arranged to allow deflection of the profile of the blade cartridge structure at least in part in response to forces applied to the non-shaving surface.

FIG. 1

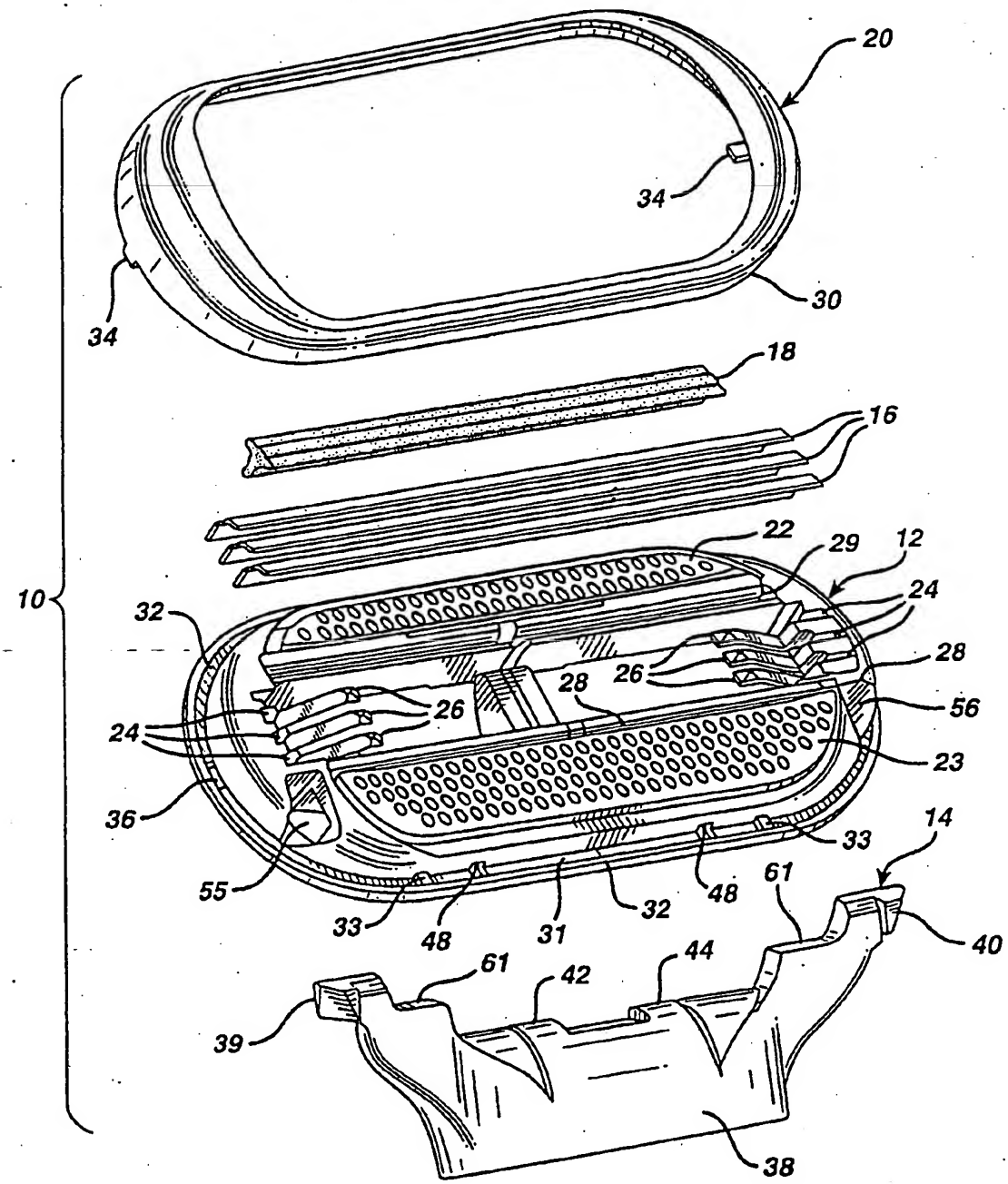

20
34
30
34
18
16
22
29
12
24
10
32
28
26
28
26
56
24
23
36
14
33
61
55
48
32
48
31
33
40
61
44
42
39
38

FIG. 2

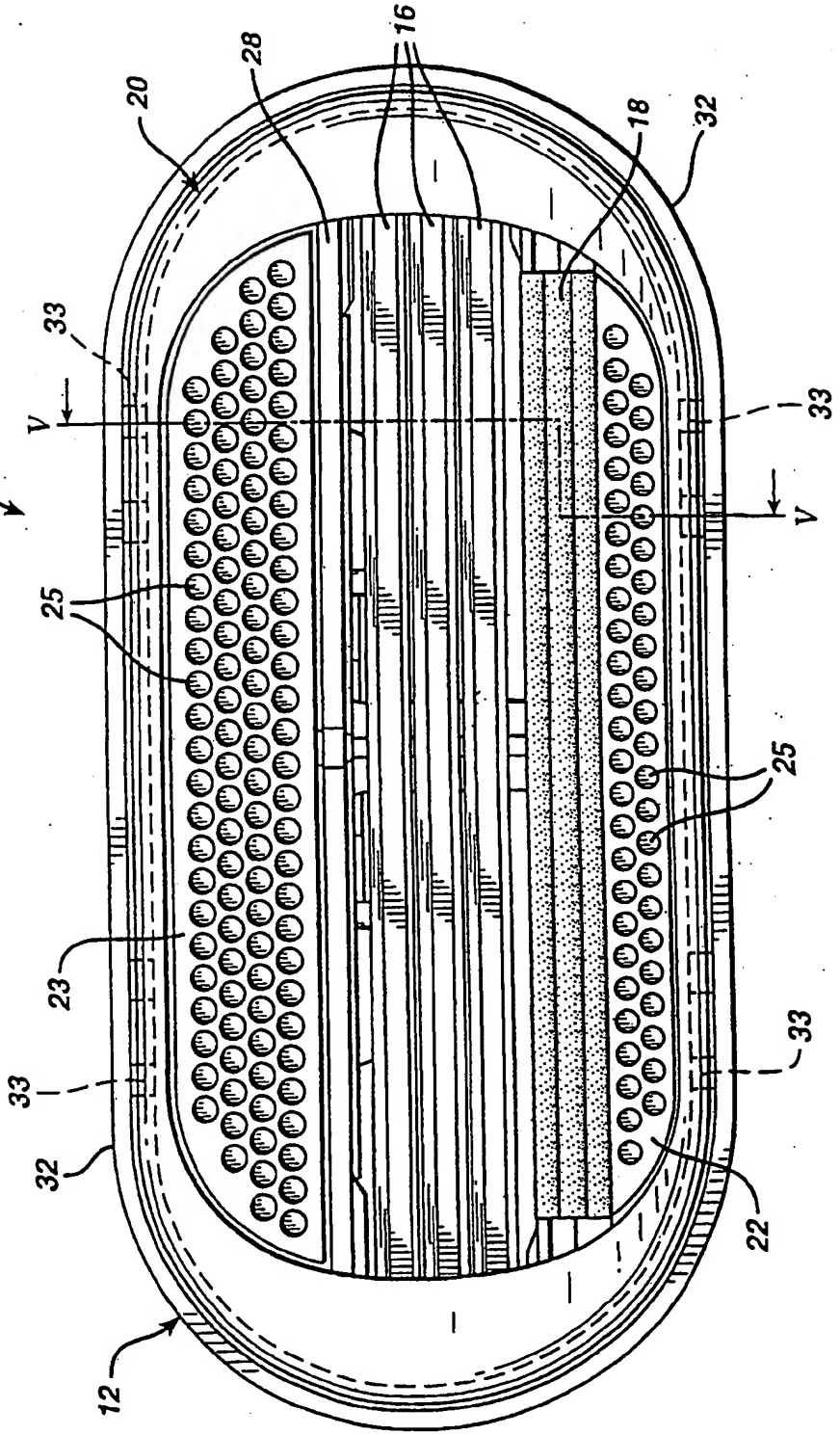


FIG. 3

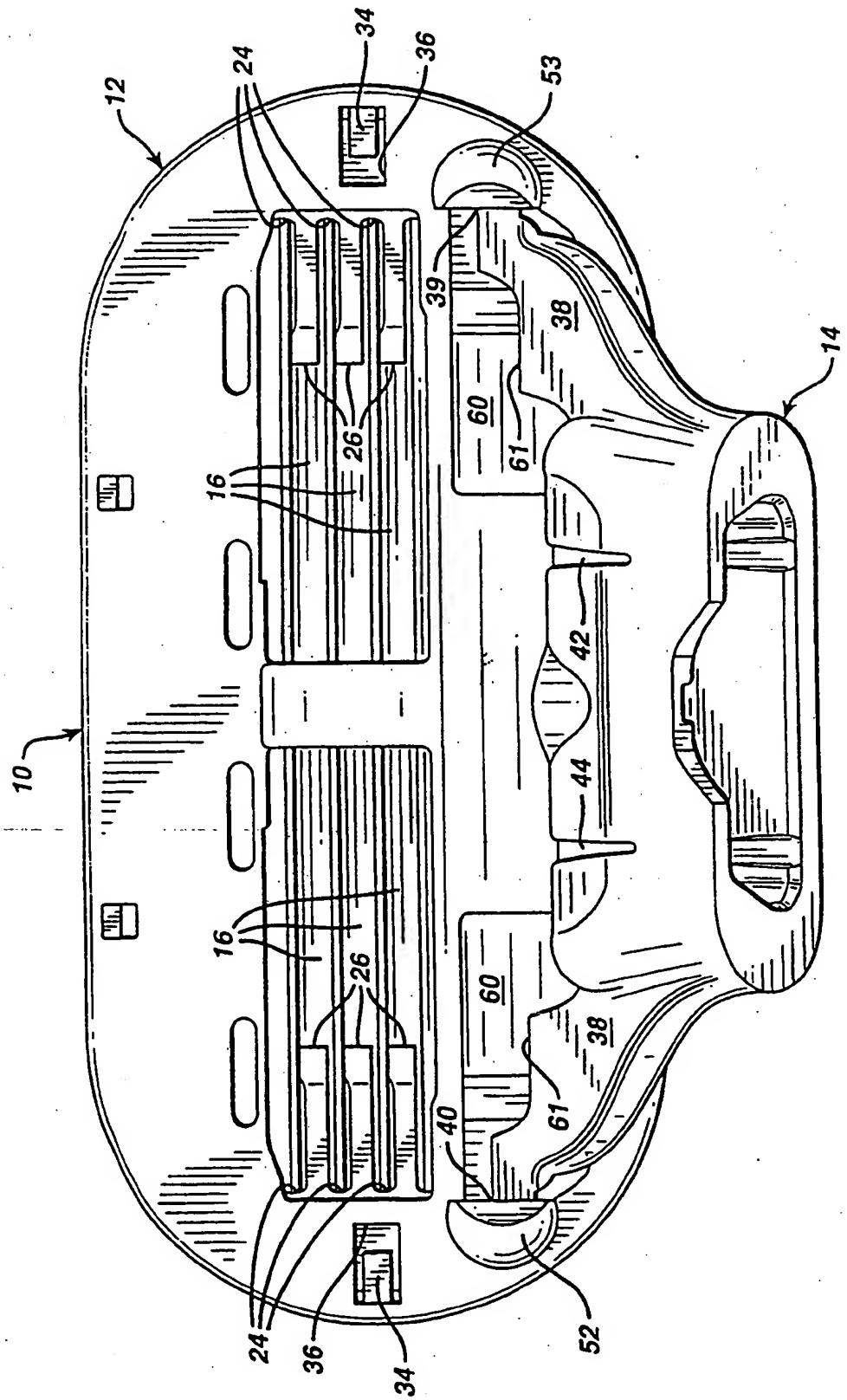

12
24
34
36
53
39
38
14
60
61
26
16
42
44
10
16
26
60
38
61
40
24
36
34
52

FIG. 4

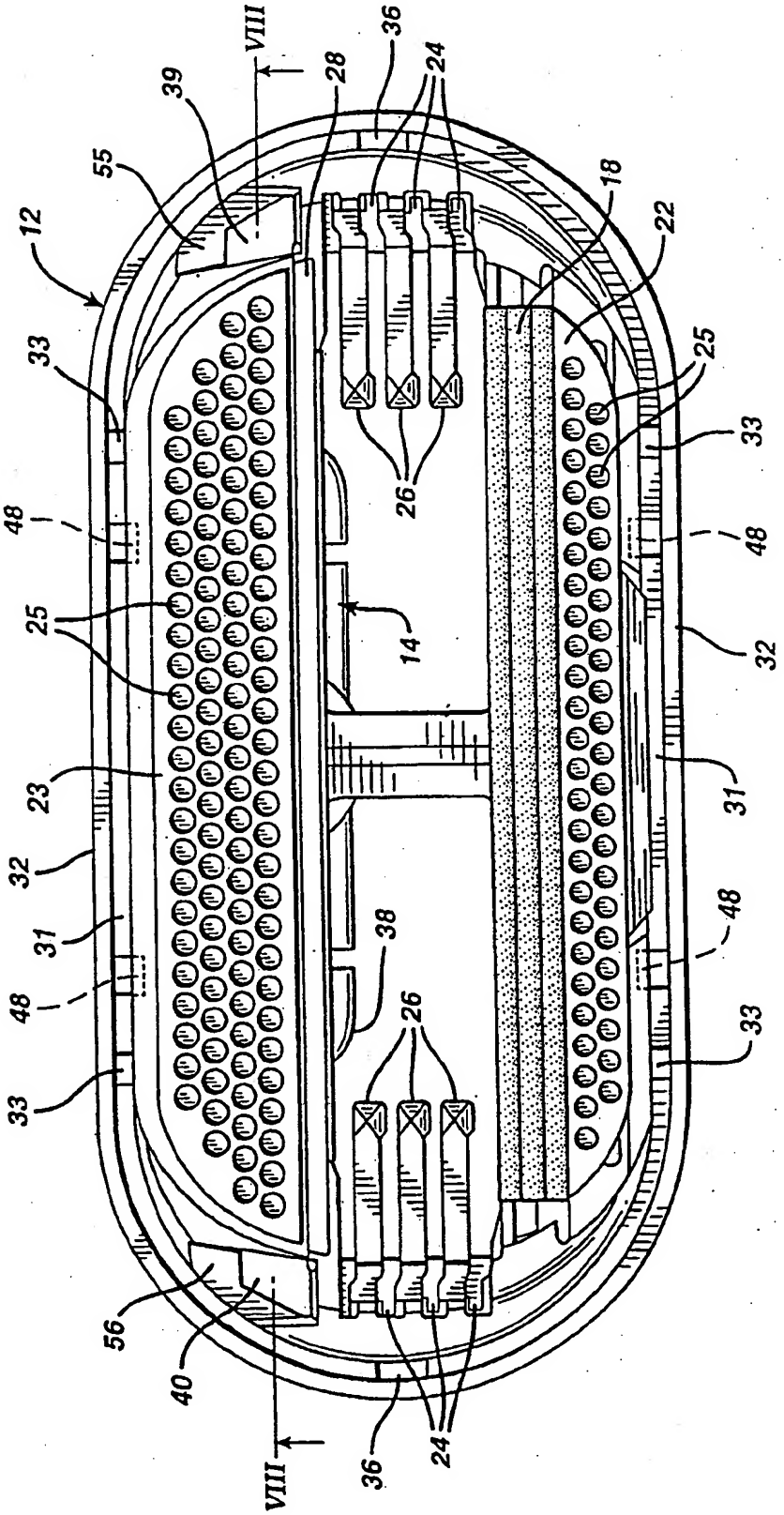
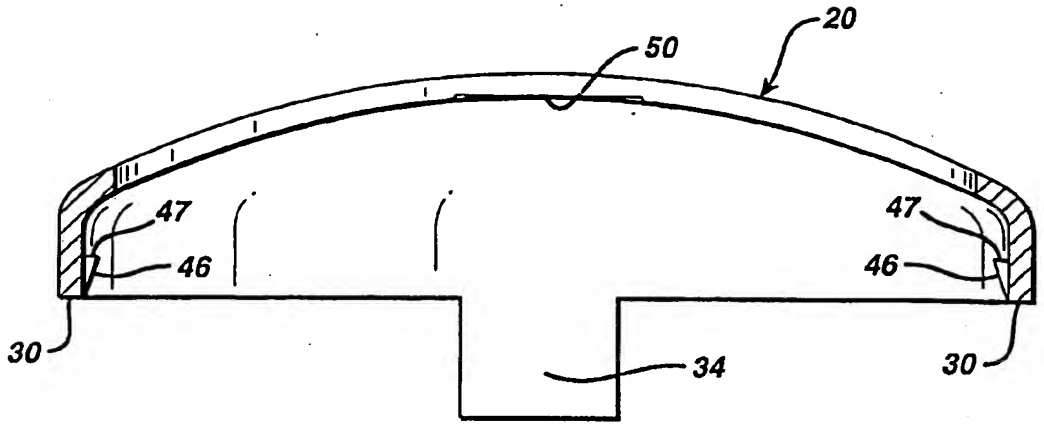


FIG. 6


20
50
47
46
47
46
30
34
30

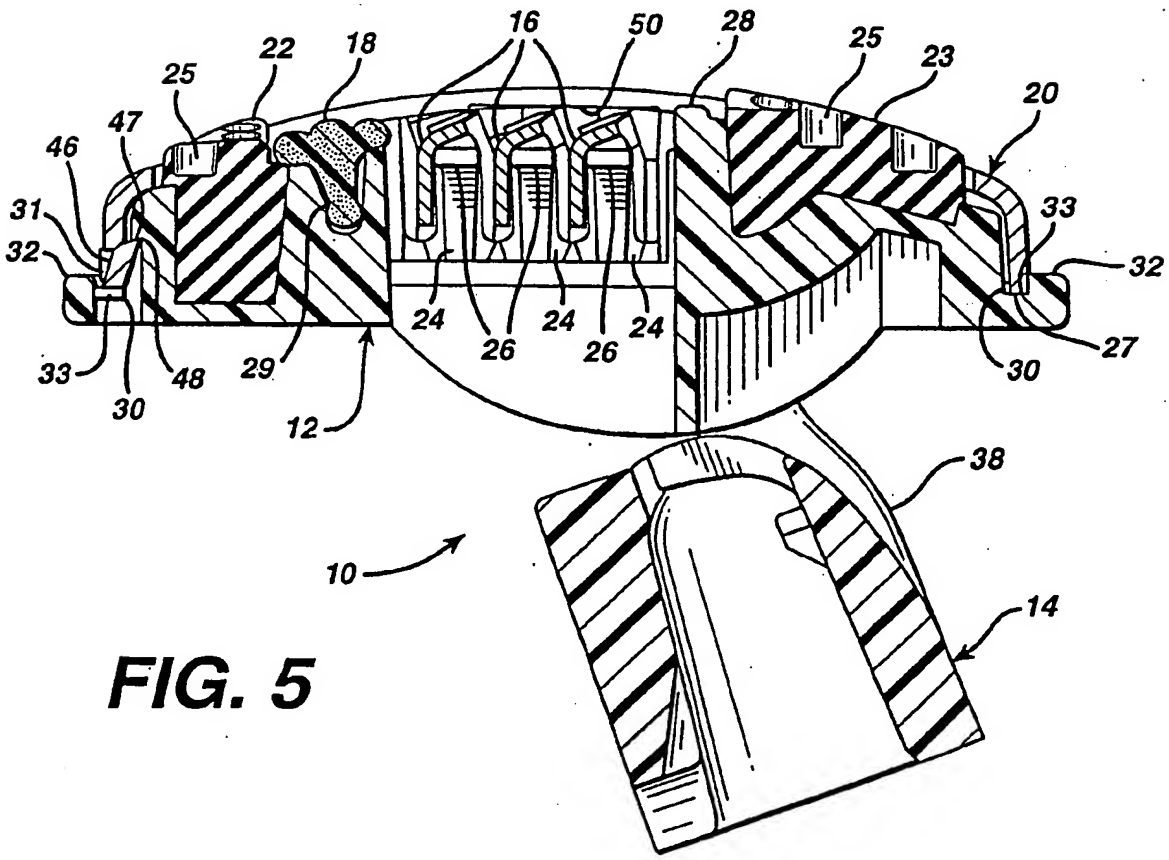

16
50
28
25
23
22
18
25
20
47
46
31
32
33
32
24
26
24
26
24
33
30
48
29
27
30
12
38
10
14

FIG. 5

FIG. 7

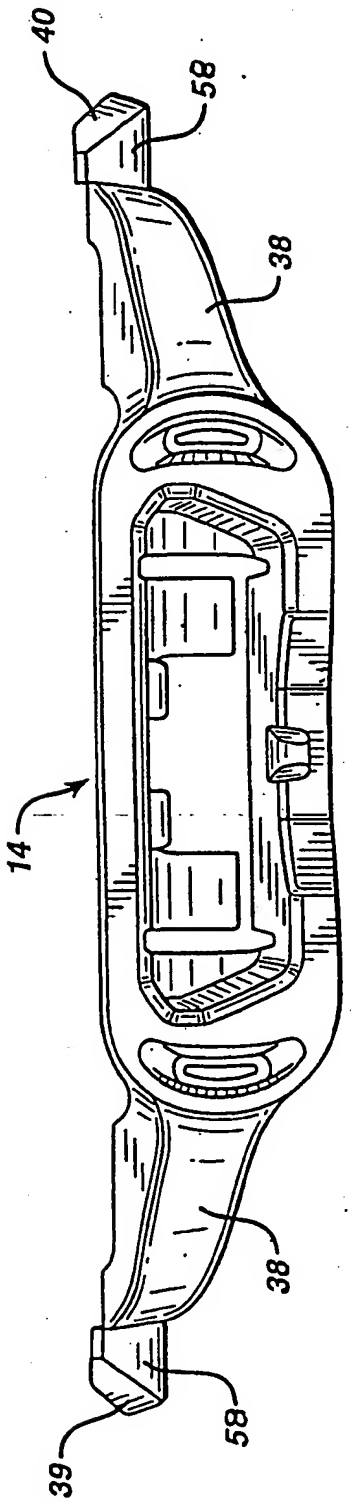


FIG. 8

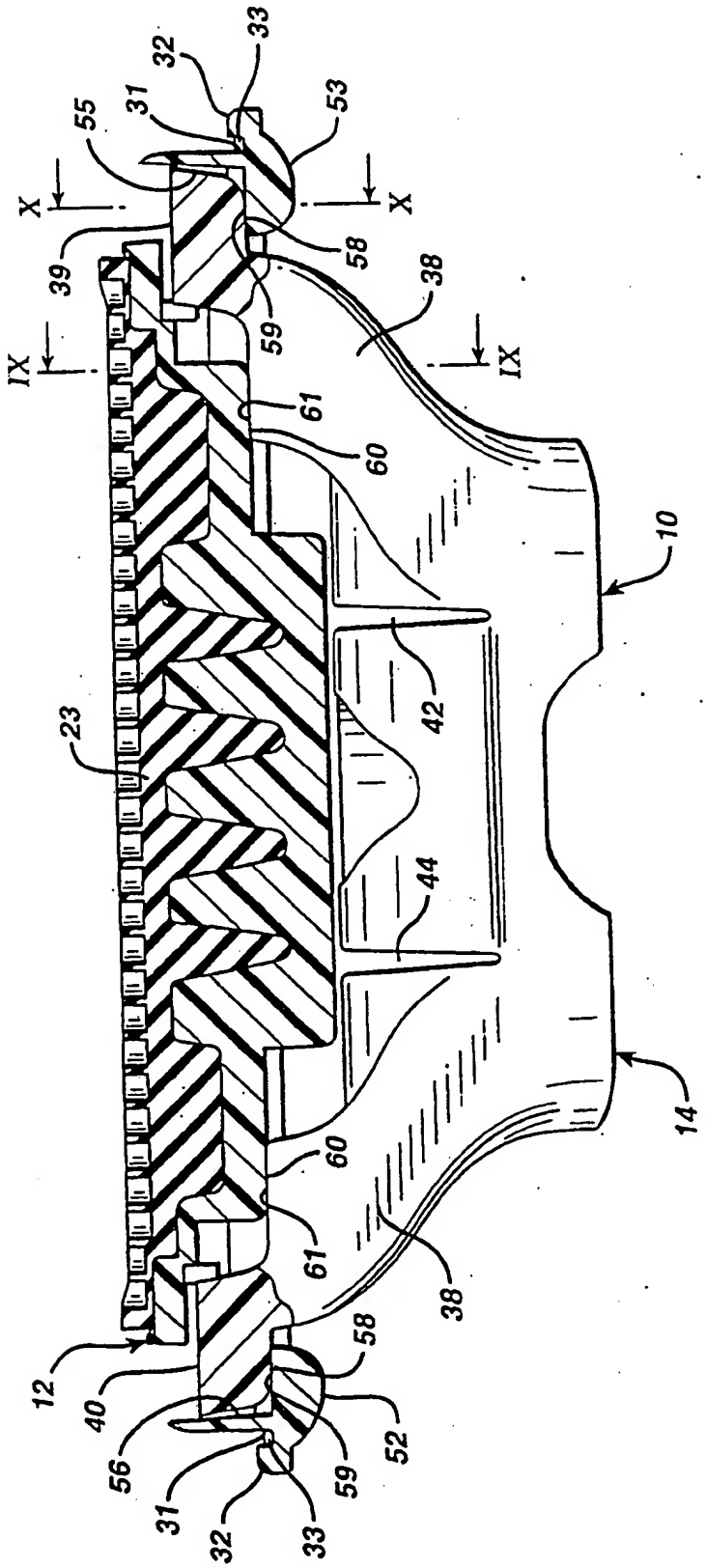

33
32
31
55
53
X
X
39
58
38
59
IX
IX
61
60
10
42
23
44
14
60
61
38
58
12
40
52
56
59
31
32
33

FIG. 10

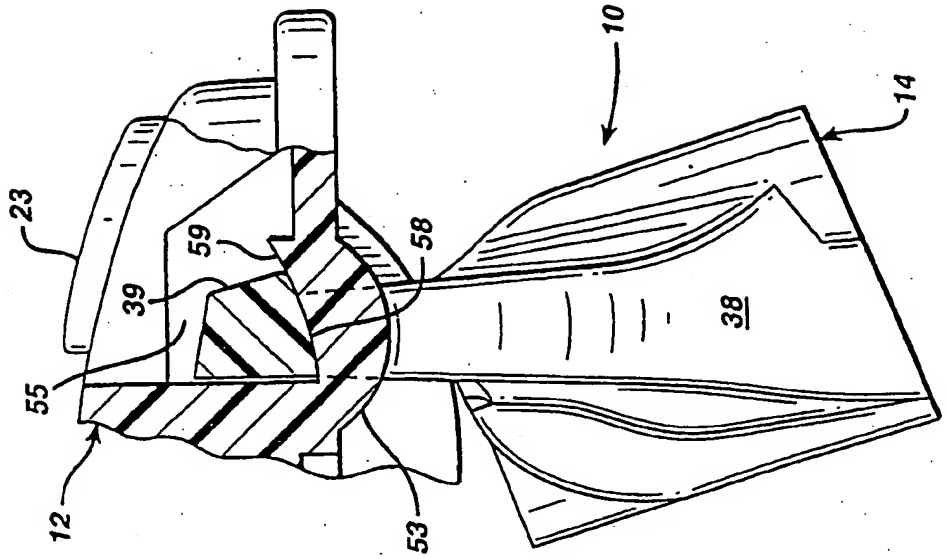


FIG. 9

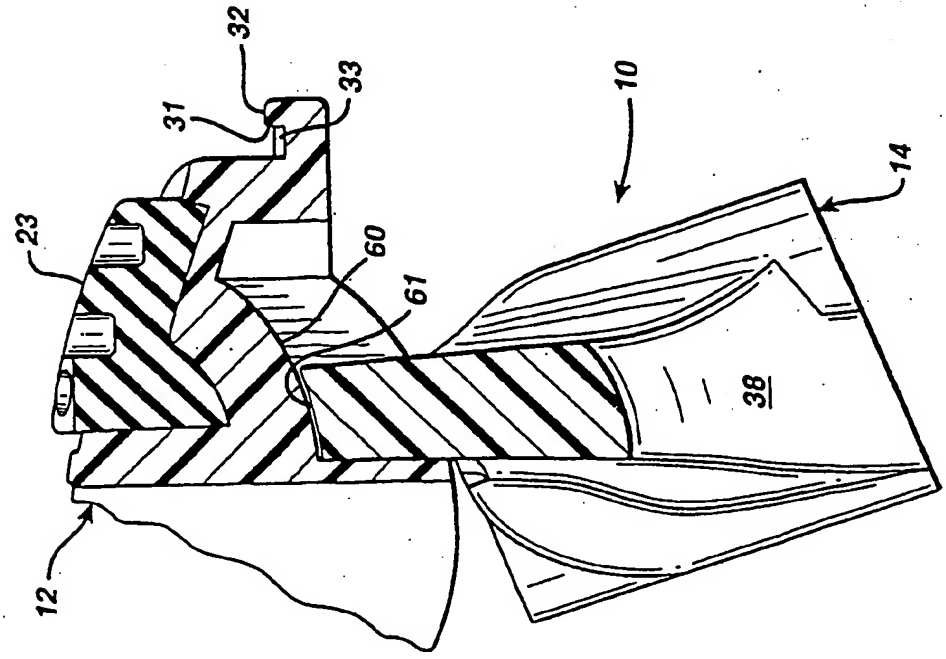


FIG. 11

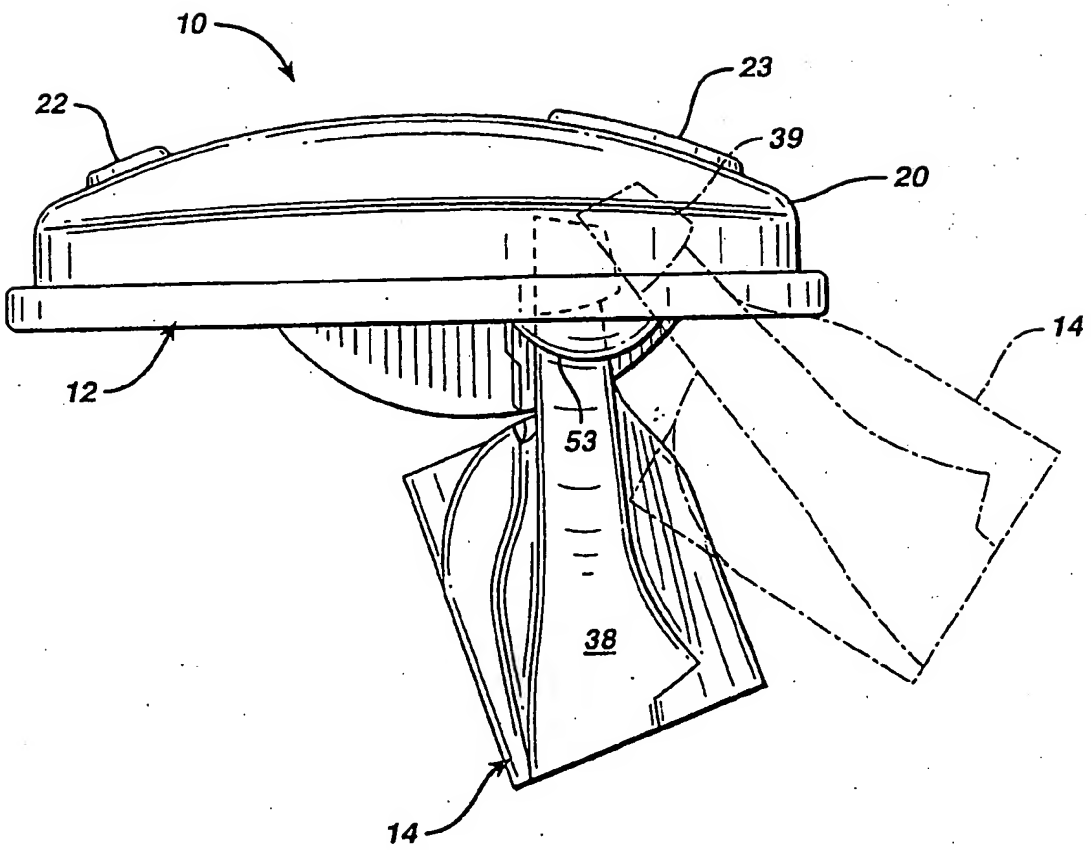


FIG. 12